

REMARKS

Claims 1-33 are pending in the application. Claims 4, 5, 16, 19, 20, 23-25, and 33 have been withdrawn from consideration.

Claims 1-3, 6-15, 17-18, 21-22, and 26-32 stand rejected under 35 U.S.C. §102(b) as anticipated by Binks '836. Claims 1-3, 7-15, 17-18, 21-22, and 26-32 stand rejected under 35 U.S.C. § 102(e) as anticipated by Utracki '956.

Applicant respectfully submits that all pending claims as amended and presented herein patentably distinguish over the cited references for at least the reasons discussed below.

The independent claims 1, 6, and 26 have been amended herein to more particularly define relative aspects of the invention. For example, referring to claim 1, the medical apparatus flow restrictor includes at least one pair of opposed restriction devices seated within the housing. These restriction devices comprise opposing planar surfaces that are placed in contact against each other. The fluid that is delivered to the inlet must pass between these opposed contacting planar surfaces. The opposed planar surfaces have a random surface roughness and opposed surface area that define a completely random restrictive flow field between the opposed surfaces. The degree of random surface roughness and the surface area of the random flow field are defined as a function of a desired flow rate of fluid through the restrictor. The random flow field is defined by a random pattern of voids, spaces, valleys, and protrusions of the relative surface roughness between the opposed planar surfaces and defines the sole regulated flow path through the restrictor for delivering a desired flow rate. Independent claims 6 and 26 have been similarly amended.

Applicant certainly recognizes and does not dispute that all materials have an inherent degree of surface roughness that may not even be discernable to the unaided eye. However, none of the references of record utilize this surface roughness (inherent or otherwise) between opposed planar surfaces as the sole regulating restrictive field in a flow restrictor. In one way or another, the references rely on precisely defined or machined channels, bores, grooves, or the like, through or between members as the primary restrictive mechanism. The surface of the materials defining these grooves or bores may have some degree of surface roughness, but this surface roughness does not define the restrictive flow field or path through the device. With the restrictor of the present claims, restriction devices having a planar surface are placed in contact against each other, such that the planar faces of the devices (whether flat, curved, and so forth) are directly opposed and in contact with each other. The only restrictive flow field between the devices is the random pattern of voids, spaces, and so forth, defined as a function of the relative surface roughness between the opposed contacting planar surfaces. There are no channels, bores, or the like having precisely defined dimensions and orientation so as to define a precise flow channel or path through or between the opposed contacting planar surfaces, as discussed in greater detail below.

The flow control valve illustrated and described in Binks '836 is fundamentally different from the flow restrictor of the present claims. With the device of Binks '836, the annular member 14 formed of a resilient material is seated in the cup-shaped member 16 of rigid material. In a first mode of operation, fluid flows through the grooves 21 in the large rim portion 17 and then through the grooves 24 in the smaller rim section 18 prior to exiting the restrictor through the outlet 33. In a second mode of operation

wherein pressure builds up from the fluid, the resilient member 14 compresses as illustrated in Figure 3 and closes off a gap 30 between the shoulder 19 and a free end of the wall 26. This action prevents any further flow of fluid through the grooves 21 and 24. Compression of the axially member 14 also causes restriction of the central passage 15 through the annular member 14. Thus, the restrictive mechanism in the control valve according to Binks '836 is compression of the member 14, which results in closing of the path through the grooves 21, 24 and restriction of the main central passage 15 through the device. There is no structure whatsoever in the device that corresponds to a restrictive fluid field between opposed planar surfaces, wherein the sole regulated flow path is defined by the relative surface roughness between the opposed planar members. In the valve according to Binks '836, the primary restrictive flow path through the device constitutes the grooves 21, 24, or annular passage 15. These grooves or passage have defined geometric shapes and dimensions that dictate the fluid flow therethrough. The flow, however, is restricted or regulated by either completely closing off the grooves 21, 24, or restricting the size of the central passage 15. Arguably, there may be leakage around certain of the interfacing surfaces of the device, including between the material 14 that seals against the shoulder 19. However, any such leakage due to inherent surface roughness or defects in the material cannot reasonably be asserted as the primary or sole means of defining a restrictive flow field through the device of Binks '836.

The flow mixer of Utracki '956 utilizes opposed die members 20, 30, 32 that include precisely defined and symmetrically opposed protrusions 20', 32'. The protrusions and the exact shape thereof are the fundamental premise of the invention of

Utracki '956. The shape of the protrusions and angle of the sloped surfaces (referring to Figure 4) define inlet chamber C1 and intermediate chambers C2, C3 between the opposed die members 20, 32. The shape of the protrusions and dimensions of the channels are critical to the invention of Utracki '956, as described in detail at column 5, lines 25-63. Thus, Utracki '956 does not disclose a configuration wherein a random flow field is defined by a random pattern of voids, spaces, and the like of a relative surface roughness between opposing planar surfaces, wherein this random flow field is the sole regulated restrictive flow path through the device. The flow path between the opposed surfaces of the dies 20, 32 in the device of Utracki '956 is defined exactly with precise dimensions and sloped surfaces of the protrusions 20', 32', and is no way random or defined by opposed contacting planar surfaces having a relative degree of surface roughness therebetween. The material defining the chambers C2, C3 and protrusions 20', 32' in the device of Utracki '956 may possess some degree of inherent surface roughness. However, it cannot be reasonably asserted that this surface roughness is the primary or sole mechanism by which flow is regulated and restricted through the device.

It is respectfully submitted that the Examiner's position that patentable weight is not given to the surface roughness limitation because Applicant has admitted that such surface roughness may be inherent to the material being used is not proper. The present claims call for the sole regulated restrictive flow path through the restrictor be defined by the random flow field of opposed planar surfaces, and more particularly by The relative random surface roughness between the surfaces. This is fundamentally different from the structures of the cited references. It is respectfully submitted that

independent claim 1 and its respective dependent claims are allowable. Independent claim 6 is also allowable. Independent claim 26 and dependent claim 27-33 are thus also allowable.

With the present amendment, Applicant respectfully submits that all pending claims are allowable over the art of record, and that the application is in condition for allowance. Favorable action thereon is respectfully requested. The Examiner is encouraged to contact the undersigned at his convenience should he have any questions regarding this matter or require any additional information.

If any fee or extension of time is required to obtain entry of this Amendment, the undersigned hereby petitions the Commissioner to grant any necessary time extension and authorizes charging Deposit Account No. 04-1403 for any such fee not submitted herewith.

Respectfully submitted,

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3/28/07
Date

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